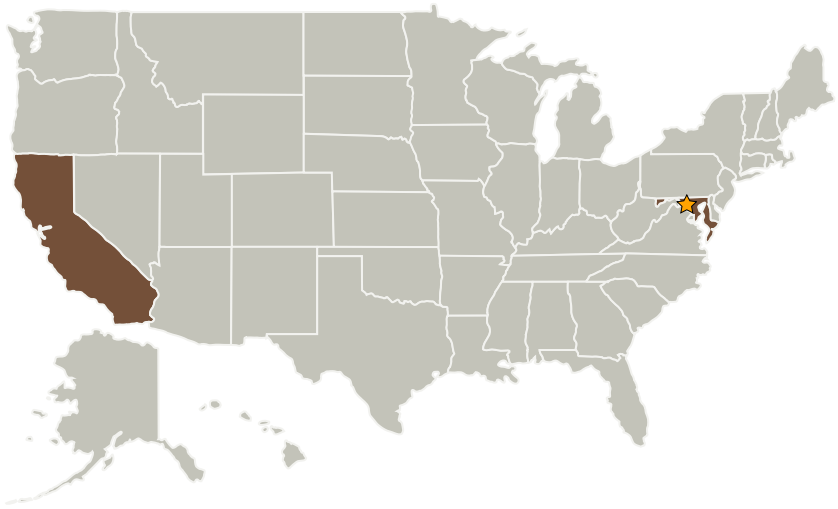
High-Speed, Low Power 256 Channel Gamma Radiation Array Detector ASIC, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

Building on prior success in detector electronics, we propose to design and fabricate a 256 channel readout ASIC for solid state gamma radiation array detectors having a power consumption of less 100 microW/pixel, an event detection throughput of more than 10,000 events/sec, and a dynamic range of 20-600KeV, while providing a spectral resolution of 1% or less in a footprint of less than 12 x 12 mm. This will allow the creation of high-speed 20 x 20 mm CZT detectors with 256 to 512 pixels (1 mm or less pitch). Starting with prior proven designs, we will introduce an innovative, patent-pending readout scheme that reduces digitization to only one signal per channel. We will also replace polling methods with sparse access and an innovative technique that can keep most of the pixels operating while reading out data. These innovations may increase the ASIC event detection rate by orders of magnitude while reducing system power and processing requirements. These innovations are essential for upgrading current gamma detection technology for future missions. There exists no ASICs today that can come close to achieving this performance.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Aguila Technologies Inc.	Supporting Organization	Industry	SAN MARCOS, California

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

M Albert Capote

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes